Amendments to the claims:

This listing of claims is proposed to replace all prior versions, and listings, of claims in the application:

1. (Currently amended) A method of applying overlaid perturbation vectors for gradient feedback transmit antenna array adaptation in a communication system, wherein the communication system includes a transmitter and a receiver, and wherein the transmitter includes a plurality of antennae, comprising the acts of:

a) overlaying at least one weight vector perturbation vector;

b) measuring signals transmitted in accordance with multiple weight vector perturbation vectors during a measurement interval, wherein the measurement interval has a greater duration than a feedback interval;

c) generating a feedback based on the measurements of act (b);

d) determining a new weight vector perturbation vector based on the feedback generated in the act (c); and

e) returning to the act (a);

wherein an even weight vector, an odd weight vector and a data weight vector are represented by the following equations:

i) $$\mathbf{w}_{even}(i) = \frac{\mathbf{w}_{base}(i) + \beta \left\| \mathbf{w}_{base}(i) \right\| \cdot \sum_{k=i-I+1}^{i} \mathbf{v}(k)}{\left\| \mathbf{w}_{base}(i) + \beta \left\| \mathbf{w}_{base}(i) \right\| \cdot \sum_{k=i-I+1}^{i} \mathbf{v}(k) \right\|};$$

ii) $$\mathbf{w}_{odd}(i) = \frac{\mathbf{w}_{base}(i) - \beta \left\| \mathbf{w}_{base}(i) \right\| \cdot \sum_{k=i-I+1}^{i} \mathbf{v}(k)}{\left\| \mathbf{w}_{base}(i) - \beta \left\| \mathbf{w}_{base}(i) \right\| \cdot \sum_{k=i-I+1}^{i} \mathbf{v}(k) \right\|}; \text{ and}$$

iii) $$\mathbf{w}(i) = \frac{\mathbf{w}_{even}(i) + \mathbf{w}_{odd}(i)}{2}.$$

2. (Original) The method of applying overlaid perturbation vectors as defined in Claim 1, wherein the act (c) comprises generating at least one feedback bit per feedback interval.

3. (Original) The method of applying overlaid perturbation vectors as defined in Claim 1, wherein the communication system comprises a DS-CDMA communication system.

4. (Original) The method of applying overlaid perturbation vectors as defined in Claim 1, wherein the measurement interval is approximately 2 times the feedback interval.

5. (Canceled)

6. (Currently amended) The method according to Claim 1 ~~5~~ wherein the perturbation vectors $\mathbf{v}(i)$ have a long term average or statistical autocorrelation given by the following equation:

$$\lim_{K\to\infty}\frac{1}{K}\sum_{k=i}^{i+K-1}\mathbf{v}(k)\mathbf{v}^H(k)=2\mathbf{I}.$$

7. (Original) The method according to claim 6 wherein the parameter β defines an adaptation rate.

8. (Currently amended) The method of applying overlaid perturbation vectors as defined in Claim 1 ~~5~~, wherein the step (d) of Claim 1 comprises the following sub-steps:

i) waiting for a new measurement interval and reception of the feedback;

ii) if the feedback indicates that an even channel yields better results, then determining a base weight utilizing a first equation, else determining the base weight utilizing a second equation; and

iii) determining new values of the even weight vector, the odd weight vector and the data weight vector.

9. (Original) The method of applying overlaid perturbation vectors as defined in Claim 8, wherein the first equation is represented by the following equation:

$$\mathbf{w}_{base}(i) = \frac{\sum_{k=i-I}^{i-1} \mathbf{w}_{even}(k)}{\left\| \sum_{k=i-I}^{i-1} \mathbf{w}_{even}(k) \right\|}.$$

10. (Original) The method of applying overlaid perturbation vectors as defined in Claim 8, wherein the second equation is represented by the following equation:

$$\mathbf{w}_{base}(i) = \frac{\sum_{k=i-I}^{i-1} \mathbf{w}_{odd}(k)}{\left\| \sum_{k=i-I}^{i-1} \mathbf{w}_{odd}(k) \right\|}.$$

11. (Original) The method of applying overlaid perturbation vectors as defined in Claim 1, wherein the method is capable of independently adjusting a first perturbation size that is applied at transmission during a measurement interval and a second perturbation size applied as an update to a tracked weight vector.

12. (Canceled)

13. (Canceled)

14. (Currently amended) The method of applying overlaid perturbation vectors as defined in Claim 15 ~~13~~, wherein the second index represents one of two states, wherein a first state represents "before feedback received" and a second state represents "after feedback received".

15. (Currently amended) ~~The method of applying overlaid perturbation vectors as defined in Claim 13, wherein the sub-act (d) of Claim 1 comprises~~ A method of applying overlaid perturbation vectors for gradient feedback transmit antenna array adaptation in a communication system, wherein the communication system includes a transmitter having a plurality of antennae and a receiver, the method being capable of representing lagged feedback through utilization of multiple indices including a first index and a second index, and comprising the acts of:

a) overlaying at least one weight vector perturbation vector;

b) measuring signals transmitted in accordance with multiple weight vector perturbation vectors during a measurement interval, wherein the measurement interval has a greater duration than a feedback interval;

c) generating a feedback based on the measurements of act (b);

d) determining a new weight vector perturbation vector based on the feedback generated in the act (c), including the following sub-acts:

i) determining a first index base weight, a first index even weight, a first index odd weight and a first index data weight from a first set of equations;

ii) waiting for the second time index to increment, wherein incrementing the second time index indicates a second state; and

iii) if the feedback indicates that an even channel yielded better results, then determining a second index base weight, a second index even weight, a second index odd weight and a second index data weight from a second set of equations, else determining the second index base weight, the second index even weight, the second index odd weight and the second index data weight from a third set of equations; and

e) returning to the act (a).

16. (Original) The method of applying overlaid perturbation vectors as defined in Claim 15, wherein the first set of equations is represented by the following equations:

$$\mathbf{w}_{base}(i,0)=\mathbf{w}_{base}(i-1,1);$$

$$\mathbf{v}(i)=\text{normalized test perturbation function};$$

$$\mathbf{w}_{even}(i,0)=\frac{\mathbf{w}_{base}(i,0)+\beta_1\|\mathbf{w}_{base}(i,0)\|\sum_{k=i-I+1}^{i}\mathbf{v}(k)}{\left\|\mathbf{w}_{base}(i,0)+\beta_1\|\mathbf{w}_{base}(i,0)\|\sum_{k=i-I+1}^{i}\mathbf{v}(k)\right\|};$$

$$\mathbf{w}_{odd}(i,0)=\frac{\mathbf{w}_{base}(i,0)-\beta_1\|\mathbf{w}_{base}(i,0)\|\sum_{k=i-I+1}^{i}\mathbf{v}(k)}{\left\|\mathbf{w}_{base}(i,0)-\beta_1\|\mathbf{w}_{base}(i,0)\|\sum_{k=i-I+1}^{i}\mathbf{v}(k)\right\|};\ \text{and}$$

$$\mathbf{w}(i,0)=\frac{\mathbf{w}_{even}(i,0)+\mathbf{w}_{odd}(i,0)}{2}.$$

17. (Original) The method of applying overlaid perturbation vectors as defined in Claim 15, wherein the second set of equations is represented by the following equations:

$$\mathbf{w}_{base}(i,1)=\frac{\mathbf{w}_{base}(i,0)+\frac{\beta_2}{\beta_1}\left(\frac{1}{I}\sum_{k=i-I}^{i-1}(\alpha\mathbf{w}_{even}(k,0)+(1-\alpha)\mathbf{w}_{even}(k-1,1))-\mathbf{w}_{base}(i,0)\right)}{\left\|\mathbf{w}_{base}(i,0)+\frac{\beta_2}{\beta_1}\left(\frac{1}{I}\sum_{k=i-I}^{i-1}(\alpha\mathbf{w}_{even}(k,0)+(1-\alpha)\mathbf{w}_{even}(k-1,1))-\mathbf{w}_{base}(i,0)\right)\right\|};$$

$$\mathbf{w}_{even}(i,1)=\frac{\mathbf{w}_{base}(i,1)+\beta_1\|\mathbf{w}_{base}(i,1)\|\sum_{k=i-I+1}^{i}\mathbf{v}(k)}{\left\|\mathbf{w}_{base}(i,1)+\beta_1\|\mathbf{w}_{base}(i,1)\|\sum_{k=i-I+1}^{i}\mathbf{v}(k)\right\|};$$

$$\mathbf{w}_{odd}(i,1)=\frac{\mathbf{w}_{base}(i,1)-\beta_1\|\mathbf{w}_{base}(i,1)\|\sum_{k=i-I+1}^{i}\mathbf{v}(k)}{\left\|\mathbf{w}_{base}(i,1)-\beta_1\|\mathbf{w}_{base}(i,1)\|\sum_{k=i-I+1}^{i}\mathbf{v}(k)\right\|};\ \text{and}$$

$$\mathbf{w}(i,1)=\frac{\mathbf{w}_{even}(i,1)+\mathbf{w}_{odd}(i,1)}{2}.$$

18. (Original) The method of applying overlaid perturbation vectors as defined in Claim 15, wherein the third set of equations is represented by the following equations:

$$\text{bi}\,\mathbf{w}_{base}(i,1)=\frac{\mathbf{w}_{base}(i,0)+\frac{\beta_2}{\beta_1}\left(\frac{1}{I}\sum_{k=i-I}^{i-1}(\alpha\mathbf{w}_{odd}(k,0)+(1-\alpha)\mathbf{w}_{odd}(k-1,1))-\mathbf{w}_{base}(i,0)\right)}{\left\|\mathbf{w}_{base}(i,0)+\frac{\beta_2}{\beta_1}\left(\frac{1}{I}\sum_{k=i-I}^{i-1}(\alpha\mathbf{w}_{odd}(k,0)+(1-\alpha)\mathbf{w}_{odd}(k-1,1))-\mathbf{w}'_{base}(i,0)\right)\right\|};$$

$$\mathbf{w}_{even}(i,1)=\frac{\mathbf{w}_{base}(i,1)+\beta_1\|\mathbf{w}_{base}(i,1)\|\sum_{k=i-I+1}^{i}\mathbf{v}(k)}{\left\|\mathbf{w}_{base}(i,1)+\beta_1\|\mathbf{w}_{base}(i,1)\|\sum_{k=i-I+1}^{i}\mathbf{v}(k)\right\|};$$

$$\mathbf{w}_{odd}(i,1)=\frac{\mathbf{w}_{base}(i,1)-\beta_1\|\mathbf{w}_{base}(i,1)\|\sum_{k=i-I+1}^{i}\mathbf{v}(k)}{\left\|\mathbf{w}_{base}(i,1)-\beta_1\|\mathbf{w}_{base}(i,1)\|\sum_{k=i-I+1}^{i}\mathbf{v}(k)\right\|};\text{ and}$$

$$\mathbf{w}(i,1)=\frac{\mathbf{w}_{even}(i,1)+\mathbf{w}_{odd}(i,1)}{2}.$$

19. (Currently amended) ~~The method of applying overlaid perturbation vectors as defined in Claim 13, wherein the sub-act (d) of Claim 1 comprises~~A method of applying overlaid perturbation vectors for gradient feedback transmit antenna array adaptation in a communication system, wherein the communication system includes a transmitter having a plurality of antennae and a receiver, the method being capable of representing lagged feedback through utilization of multiple indices including a first index and a second index, and comprising the acts of:

a) overlaying at least one weight vector perturbation vector;

b) measuring signals transmitted in accordance with multiple weight vector perturbation vectors during a measurement interval, wherein the measurement interval has a greater duration than a feedback interval;

c) generating a feedback based on the measurements of act (b);

d) determining a new weight vector perturbation vector based on the feedback generated in the act (c), including the following sub-acts:

i) determining a set of transmission weights according to a first set of equations, wherein the set of transmission weights are applied prior to receipt of feedback as indicated by a second time index;

ii) waiting for receipt of feedback;

iii) if the feedback indicates that an even channel yielded better results, then iv) updating the set of transmission weights according to a second set of equations;

iv) if the feedback indicates that an odd channel yielded better results, then updating the set of transmission weights according to a third set of equations; and

v) applying the updated set of transmission weights after receipt of feedback as indicated by the second time index<u>; and</u>

<u>e) returning to the act (a)</u>.

20. (Previously Presented) The method of applying overlaid perturbation vectors as defined in Claim 1, wherein the feedback consists of one bit.

21. (Original) The method of applying overlaid perturbation vectors as defined in Claim 1, wherein the feedback comprises multiple bits.

22. (Previously Presented) The method of applying overlaid perturbation vectors as defined in Claim 21, wherein the feedback consists of two bits.

23. (Previously Presented) The method of applying overlaid perturbation vectors as defined in Claim 21, wherein the feedback consists of three bits.

24. (Canceled)

25. (Canceled)

26. (Canceled)

27. (Canceled)

28. (Canceled)

29. (Canceled)

30. (Canceled)

31. (Canceled)